

PRIMARY SARCOMA OF THE PERITONEUM.

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THE paucity of surgical literature on the subject of primary sarcomatous tumors of the peritoneum and the interesting post-mortem findings regarding the questions of rapid tumor growth and metastases in the case which came to autopsy, justify me in publishing these two cases, both of which occurred in the Montreal General Hospital during the summer of 1907.

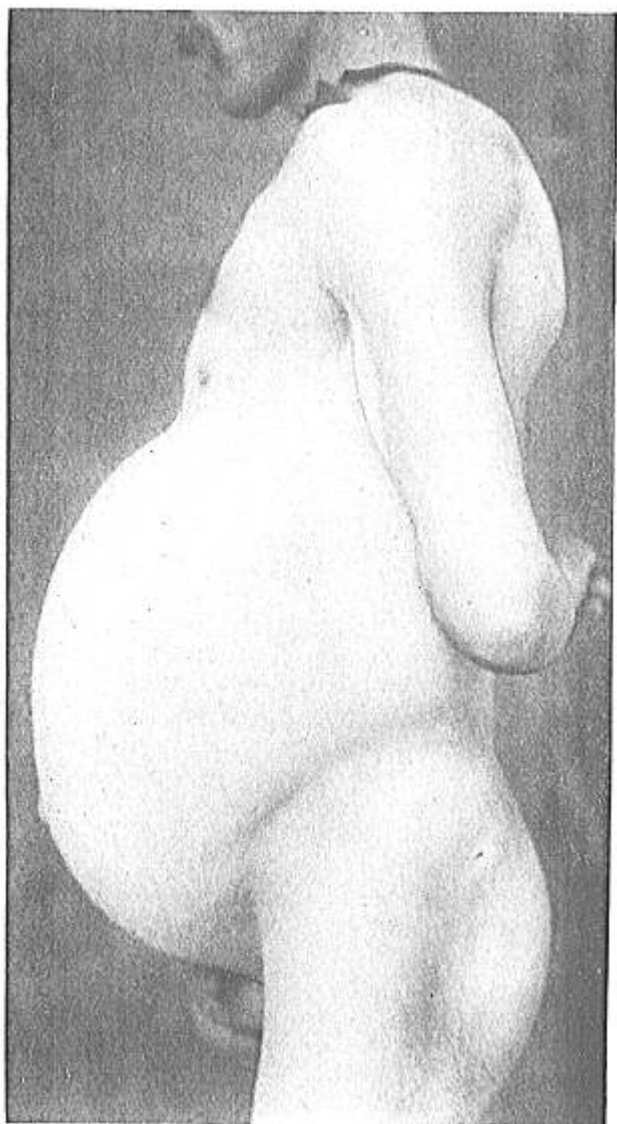
CASE I.—(561 M., 862 S., 1907 M. G. H. Reports.) N. M., sailor, aged 33, admitted to the service of Dr. Lafleur, June 22, 1907, complaining of swelling of the abdomen. Family history good; personal history negative except that he has been a hard drinker since he was 15 years of age.

Present illness.—Began nine months ago, when he decided that he did not feel as strong as before and therefore secured employment ashore. Three months later he noticed swelling of the abdomen, but attributed his supposed corpulency to drink and easy work. This abdominal enlargement gradually increased but without producing distress to the patient until a truss, which he had worn for years, became too small. He vomited several times during the summer of 1906, chiefly his breakfast, but attributed this to too much beer the night before. He had no pain or swelling of the lower extremities. There was slight dyspnoea on exertion.

Present condition.—Fairly well nourished man, of good musculature, with conjunctivæ slightly yellow. Expression anxious and malar bones slightly prominent. Weight 175 lbs. Temperature 99° and pulse 70.

On examination, thoracic organs fairly normal, but abdomen presented a peculiar condition. It was enormously distended, with marked bulging of the flanks and over the inguinal region (Fig. 1). This distention is symmetrical, and abdominal walls move freely with respiration. The superficial epigastric veins

FIG. 1.



Showing general outlines of the abdominal distention.

on either side are markedly distended and run up to anastomose with the mammary veins.

On palpation, the walls are tense but there is no rigidity on deep pressure, except over the right upper quadrant where the resistance is definitely increased but no distinct mass can be felt; no tenderness, no fluctuation.

Percussion shows a marked dull note all over the anterior aspect of the abdomen except the epigastrium and flanks, where note is tympanitic. These dull and tympanitic areas are not affected by change of posture. Liver dulness begins at sixth rib in nipple line and is continuous below with dulness noted above. No change in spleen could be made out. Urine normal except trace of bile pigment. On June 25 an exploring needle was introduced into the dull area below the umbilicus and only about 1 c.c. of bloody serum could be obtained. This fluid showed microscopically numerous large round cells, several spindle-cells and numerous blood-cells. The temperature runs from $99\frac{1}{2}^{\circ}$ to normal, and pulse about 90.

[The above is an extract from Dr. Lafleur's clinical notes of the case. At this stage the patient was transferred to the surgical ward for exploratory laparotomy.]

Extract from Surgical Notes.—The following questions regarding the diagnosis suggested themselves to us for solution at the exploratory laparotomy: (1) diffuse tuberculous peritonitis; (2) cirrhosis of the liver, with ascites; (3) omental cysts (malignant?); (4) hyatid disease, and (5) mesenteric sarcoma.

We were rather inclined to regard the trouble as tubercular, and on June 27, under ether narcosis, which caused marked cyanosis, an exploratory incision was made in the median line below the umbilicus. On opening the peritoneum several small gelatinous cysts popped out, some of which were sent to the pathologist for examination. There was no free fluid. The tumor was seen to be chiefly in the great omentum which was adherent to the parietal peritoneum. Upon tearing through the omentum the mesentery was also seen to be involved. The whole omentum was filled with these cyst-like bodies, which appeared to be caught in a very vascular stroma.

This condition extended up to and obscured a good view of the liver. So dilated were the omental veins that we were afraid that undue handling might cause hemorrhage.

The picture was one of sarcoma, rapidly growing, in the omentum and mesentery. A piece of diseased omentum was tied off and removed, for examination, and the abdomen closed without drainage. His recovery from operation was uneventful and the patient left the hospital on July 18 in much the same physical condition, except somewhat weaker, than when he came in. Unfortunately, as is usual with sailors, we lost all trace of him.

CASE II.—(859 M., 1341 S., 1907, M. G. H. Reports.)—I am indebted to my medical colleague Dr. Finley for the clinical history of this case. W. R., aged 24, waiter, admitted to Ward H. on September 18, 1907, complaining of pain in the abdomen, diarrhœa, cough, and pain in the right side of the chest. Associated with these symptoms were night sweats, anorexia, progressive loss of weight and strength, dyspnœa and hiccough. His mother died from some tubercular trouble when he was four years old. The patient had been previously fairly healthy and only uses alcohol moderately.

Present illness.—Began eleven days prior to admission with severe diarrhœa, which has been fairly constant until two days ago when it became much worse, 9–15 stools per day. The fæces are liquid and dark green in color. Patient began to cough six days before he came to hospital. Very little expectoration until last night, when he expectorated some “black stuff” which suggested blood. Coincident with the beginning of the cough he felt abdominal pain, at first slight but daily becoming more severe. These pains are now lancinating in character and require morphia to procure sleep. He states that he had an attack of colic two months ago which lasted for three hours and was very severe. There was no recurrence until present illness. Since January, 1907 he has lost 39 pounds in weight and has had night sweats since September 1.

On admission.—Well-developed and fairly well-nourished man, with pale anxious face, covered with perspiration. No

anæmia of mucous membranes. Assumes any position in bed. Temperature subnormal, pulse 96; respirations 24.

Physical examination.—(a) *Thorax*: Dulness in both axillæ, otherwise resonant in front with normal breath sounds. Behind, marked dulness on right side below level of fifth spine. Absolutely flat note at base of right lung. Over upper part of this area, tactile fremitus and breath sounds are impaired, while at lower part both are quite absent. Ægophony at base. On the left side there is dulness, with diminished respiratory sounds. (b) *Abdomen*: Symmetrically distended, rigid, and markedly tender over hypogastric region. There is marked dulness everywhere, except over the stomach and down as far as the umbilicus. No fluctuation and no change in dull area by change in posture. Digital rectal examination is negative. Urine 1010, no casts, albumin or sugar.

In spite of rest, diet and treatment, the diarrhœa persists. On September 22 an aspirating needle was introduced into the right pleura and a large quantity of thin, purulent fluid removed, a smear of which shows numerous polynuclears but no organisms.

Next day I saw the case with Dr. Finley, and was struck with the similarity between it and the previous one. The patient was transferred to my ward for thoracotomy and exploratory laparotomy, which were proceeded with immediately. Upon opening the right pleural cavity posteriorly, about a quart of sero-sanguineous fluid gushed out. Both layers of pleuræ were greatly thickened and studded with rather firm nodules varying in size from a split pea to a bean. A tube was left in the thoracotomy wound through which considerable fluid continued to drain.

The abdomen was next opened in the median line below the umbilicus. In cutting through the abdominal wall numerous large veins were encountered, the operator remarking that they were suggestive of sarcoma. In the peritoneal cavity was a large quantity of fluid, similar to that which had just been evacuated from the right pleural sac. The parietal peritoneum was very thick, dark red in color, and studded with nodules similar to those in the pleura. The great omentum was seen to be enormously thickened and studded with dark, purplish nodules. A pathological examination of excised specimens showed a large round cell sarcoma.

The coils of intestine were much thickened and nodular, feeling like strands of rope, and were very adherent to one another. The mesenteric glands were very large and hard. The abdomen was hurriedly closed with through and through sutures, as the patient took the anæsthetic badly, and his pulse was very weak.

After operation the patient grew steadily worse, the temperature being mostly subnormal, and the pulse weak and rapid, until he died on the evening of the second day after operation.

EXCERPTS FROM AUTOPSY RECORD OF W. R. WITH PARTICULAR RELEVANCY TO THE DEGREE AND CHARACTER OF MAIN TUMOR AND ITS METASTASES. (SERVICE OF DR. ELDER.)

Peritoneal Cavity.—Upon opening the abdomen a moderate amount of salmon-colored, turbid, watery pus flows out. The omentum is large and covers the whole of the intestines, being wrapped into both loins and extending into the pelvis. It is much thickened in places, measuring about 1.5 cm. in thickness; this is due to numerous small nodules of soft, friable, greyish-pink material, some being distinct and others confluent. On section these nodules are homogeneous in appearance and soft. The borders of the omentum are especially filled with this tissue. The vessels are dilated. There are several dilated veins extending from the omentum across the transverse colon and gastrocolic omentum to the lower border of the stomach. The parietal peritoneum, in the neighborhood of the spleen, is thickened to about 1 cm., moderately firm, but friable. On section, this thickening is seen to be due to infiltration with a tumor mass similar to that found in the omentum. The parietal peritoneum in the pelvis, especially that lying between the bladder and rectum, is similarly infiltrated. The *Mesenteric Lymph Nodes* are enlarged, the largest being about the size of pigeons' eggs. The whole mesentery, too, is thickened to about 1 cm. The surface of the mesentery contains purplish blotches. On section the enlarged glands and mesenteric tissue are seen to consist almost entirely of homogeneous, greyish-pink, soft, moderately friable tissue similar to that seen elsewhere. In certain areas there is definite evidence of a hemorrhagic condition. Covering the whole of the large bowel and looking like large appendices epiploicæ are numerous areas measuring from 2 to

4 cm. in length, made up of similar tissue to that described above; some on section are very hemorrhagic. In places the tumor has infiltrated the intestinal wall. There is an area in the ileum about 60 cm. from the ileocæcal valve which is completely infiltrated by the tumor. This surface appears nodular and mottled. Upon opening, the mucosa shows a small area 3 by 2 cm. of tissue denuded of mucosa, hyperæmic in appearance, though smooth. The intestinal wall is about 1 cm. in thickness.

The glands about the lesser curvature of the stomach and the head of the pancreas are markedly enlarged. The retroperitoneal and pelvic glands are enlarged and soft. There are numerous polypi of tumor tissue upon the under surface of the liver and over the spleen. The *Appendix* is very much thickened, measuring 8 cm. in length and 2 cm. in thickness. The meso-appendix is similarly involved. *Diaphragm*: left fifth space, right fourth space.

Pleural Cavities.—The right cavity contains a small amount of pus. The parietal and visceral pleuræ are covered with a thick, yellowish, plastic exudate. The pleura is injected. The diaphragm is thickened, being mottled in appearance and infiltrated with new growth. It measures 1.2 cm. in thickness. The upper surface contains numerous heaped up masses of similar tumor tissue. The left pleura shows a profuse covering of both parietal and visceral pleuræ, with raised, flattened discs of tumor mass. The diaphragm is involved in a manner similar to that on the right side.

Pericardial Cavity.—Between the pericardium and the sternum there are masses of tumor. The heart shows on its anterior aspect numerous small areas of whitish thickened epicardium. There is a normal amount of straw colored fluid.

Spleen.—Also shows two or three small areas of tumor tissue on the upper surface. On section the spleen is pale. The Malpighian bodies are large and numerous. An increased amount of pulp comes away on scraping.

Pancreas.—Normal in color and consistence, covered with tumor-glands and thickened peritoneum.

The thoracic duct, especially in the abdomen, together with the lymphatics leading into it, is thickened and its lumen is obliterated by tumor tissue.

Liver.—Weight, 2045 Gm. Normal in consistence, some-

what pale in color and soft. The upper surface is adherent to the diaphragm and infiltrated by tumors. Along the outer border and outer surface of the left lobe are numerous tags of pale yellowish-pink, very soft tissue adherent to the peritoneum but easily brushed off. On section the liver is pale, with lobules indistinct, and friable.

Kidneys.—Normal except that in the kidney substance there are several small nodules measuring 3 mm. in diameter, of greyish, moderately firm, semi-translucent tissue.

Anatomical Diagnosis.—General sarcomatosis of the omentum, glands of the mesentery, retroperitoneal and pelvic glands, bronchial glands, peritoneum, large and small intestines, diaphragm and pleuræ, pancreas and thoracic duct. Acute diffuent peritonitis. Acute pleuritis with empyema. Septicæmia (streptococcic infection.) Ascites. Fatty liver. Perihepatitis. Perisplenitis.

MICROSCOPICAL EXAMINATION.

Omentum.—The omental tissue is everywhere infiltrated with small round cells with large spherical nuclei which are granular in appearance, the cells having but little protoplasm. Large numbers of these cells are in mytosis. There is very little intercellular substance, only here and there do the cellular masses present connective tissue trabeculæ. In some of the less dense areas there still remain isolated clusters of omental fat as indicated by large spaces. In areas that are only sparsely invaded the above described cells follow along in irregular columns between the fat cells. In places there are areas which show enormous vascularity, many vessels are new. At one side of the section there is considerable fibrous tissue and smooth muscle. The muscle is everywhere infiltrated with the above described lymphoid cells. In what appears to be the zone between the muscle and the fat tissue is a fairly dense layer of fibrin.

Intestine.—The mucosa over part of the section is absent, the exposed submucosa is covered with a layer of necrotic cells as evidenced by their taking the red stain and showing no nuclei. The submucosa and the muscle layer are infiltrated by large numbers of cells similar to those described above in the omentum. The normal appearance of the submucosa and muscularis is completely lost; here and there are isolated islands of circular muscle and often in the same field similar islands of

longitudinal muscle. The submucosa is densely packed with tumor cells, more so than any other layer of the gut. There is also a band of similar cells lying beneath the serosa and between it and the outer muscle layer. Upon the surface of the serosa there is a collection of loose tissue made up of similar cells and a small amount of fibrous tissue; apparently this condition is due to the infiltration of old adhesions.

Diaphragm.—The muscle fibres present are for the most part cut longitudinally; striations are well marked. The individual fibres are widely separated by masses of tumor cells which extend in long solid columns between the muscle fibres. These cells make up the greater part of the section. At the edges of the section the tumor elements are more densely aggregated than those that have infiltrated the muscle.

Pancreas.—The alveolar tissue about the organ is composed almost entirely of tumor cells. In places these project down into the substance of the pancreas, for the most part following the trabeculæ, though there are places where they break through the connective tissue capsule of the lobes and scatter all through the acini.

[For the foregoing report, the author wishes to thank Dr. C. W. Duval, the hospital pathologist, and Dr. F. D. Gurd, his assistant.]

As was hinted in the beginning of this paper, I was astonished in looking through such surgical works of reference as were at my command, to find so little written upon this subject. Most writers do not mention the subject at all, while others say that while the condition might occur it must be extremely rare. In Sajous' "Analytical Cyclopædia of Practical Medicine" (1901), vol. v., p. 436, I found the best reference: "Sarcoma of the mesentery is of rapid growth and almost always ends fatally. Ascites is usually present. There is rapid involvement of surrounding structures, making removal impossible." A review of the literature from 1896 to 1900 follows, which shows that out of 57 cases of solid tumors of the mesentery reported, 11 were sarcoma. One case, that of a physician, is reported, in which a diagnosis of cirrhotic liver was made, based upon ascites and inability to

palpate the liver or outline it by percussion. Necropsy showed a tumor involving the mesentery and adjacent glands, with numerous metastases in the pancreas, greater and lesser omentum, pleura, bronchial and inguinal glands. Microscopically it proved to be lymphosarcoma of the mesentery.

The clinical pictures presented by our two cases varied considerably, as a reference to the histories will show. Yet both suggested tubercular peritonitis in some of its varied forms. The second case was particularly suggestive of rapid, miliary tuberculosis of the serous sacs (peritoneum and pleuræ), while Case I. rather pointed to the chronic form of tubercular disease of the peritoneum, where there is present great thickening of the omentum with little or no fluid. It is greatly to be questioned if some cases, at least, of peritonitis attributed to tubercular infection, and in which no exploratory operation or post-mortem examination has been made, may not have been really cases of sarcoma of the peritoneum.

I do not think that clinically we are yet in a position to make other than a tentative diagnosis in these cases, which diagnosis must be confirmed either by post-mortem findings or ante-mortem specimens subjected to microscopical examination.